

Effects of Psychosocial Interventions for Patients with Breast Cancer: A Meta-analysis

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Objective: This study involved a meta-analysis of South Korean studies regarding psychosocial interventions for patients with breast cancer to provide basic data to support the development of an integrated healthcare service model.

Methods: Randomized controlled studies with a pretest-posttest design were selected, and those presenting means, standard deviations, and standardized mean differences were included. For quality evaluation and heterogeneity testing, the Jadad scale and the Q-value and I^2 were used. To estimate the effect size of each study, Hedge's g was used. Publication bias was analyzed with the Funnel plot and Egger's regression test.

Results: Of the 28 studies selected for the meta-analysis was performed on eight. The total number of datasets included in the meta-analysis was 33. The evaluation based on the Jadad scale revealed no significant inter-rater variation ($p = 0.35$). The mean number of sessions was 7.93 and the mean intervention time was 13.2 hours. The interventions were mostly administered in a group structure (94%) and, regarding the type, they were categorized as integrated (36.4%), cognitive (30.3%), and meditation (24.2%). The mean effect size was 1.21 against no treatment group.

Conclusion: The analyzed studies showed heterogeneity, with a corresponding asymmetry found on the Funnel plot. Despite the heterogeneity and publication bias, the mean effect size was significantly large. Cognitive interventions, meditation, and psychological education programs are expected to assist in reducing negative emotions and enhancing quality of life in patients with breast cancer.

KEY WORDS: Breast cancer; Psychosocial intervention; Meta-analysis.

INTRODUCTION

The incidence of breast cancer among South Korean females in 2018 was 20.5%, making it the most common cancer among females in the country. Indeed, the number of patients with breast cancer has been increasing annually since 1999 [1]. National efforts to reduce the incidence and mortality of breast cancer include the National Cancer Screening (in a two-year cycle for females aged ≥ 40 years). Notably, in 2018, the incidence of breast cancer was 65.6% (95% confidence interval [CI]: 64.7–66.5%), a marked increase compared to 25.1%

(95% CI: 24.4–25.7%) in 1999 [1]. In light of the decreasing incidence of gastric cancer in females (28.4% in 1999 vs. 19.6% in 2018), there is an urgent need to address the occurrence, as well as prevention and countermeasures, of breast cancer [1]. Mortality due to the disease has also shown a significant increase by 2.65 times, from 989 persons in 1997 to 2,622 persons in 2019. In addition to prevention and diagnosis, another issue in patients with breast cancer is the psychosocial problems; accordingly, it has attracted considerable social interest and active academic research [2,3]. Interest in post-treatment or postoperative quality of life in patients with cancer has also risen, with studies frequently reporting on the related indicators [4].

Therefore, since 2000, studies focusing on the enhancement of quality of life in patients with breast cancer have been conducted in South Korea. Methods to enhance the quality of life include various treatment and in-

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intervention types; additionally, psychosocial interventions, in the field of psychiatric health and psychology, are often performed. A psychosocial intervention refers to psychotherapy/psychological treatment and psychological education focusing on psychosocial adaptation. A South Korean meta-analysis investigated the effects of intervention programs on depression in patients with breast cancer; however, its main focus was on depression rather than psychosocial aspects [5]. In the case of patients with breast cancer, the following psychiatric or psychosocial problems (in addition to depression), and problems related to reduced quality of life, can be observed: reduced self-esteem, reduced interpersonal sensitivity, increased stress, anxiety disorder, reduced sleep quality, and physical symptoms [6]. In severe cases, patients may experience major depressive disorder, which either goes unrecognized or remains untreated for other reasons. In such cases, an increase in physical symptoms, coupled with low treatment adherence and functional disorders, may necessitate subsequent treatment [7]. As patients with breast cancer show a tendency to suppress their emotions, either negative or positive, as well as an inability to clearly express their feelings, they have been reported to experience a considerable level of stress in interpersonal relationships [8], that further exerts a negative effect on interpersonal relationships; this proves detrimental to social and occupational functions. Notably, females experiencing social isolation after diagnosis of breast cancer have been shown to have high mortality rates [9]. Meanwhile, in patients with breast cancer, quality of life has been shown to be significantly associated with self-esteem, optimism, and support from friends and family, with these factors alleviating their pain and improving well-being [10,11].

The present study aimed to determine the effects of psychosocial interventions on patients with breast cancer in South Korea and to identify the potential influencing factors. The findings can provide basic data that can contribute to the development of an integrated model of healthcare services for psychosocial adaptation of patients with breast cancer.

METHODS

Ethical Considerations

The study was approved by the Institutional Review

Board of Wonkwang University Medical Center (WKUH 2021-03-037-002).

Data Collection

For the meta-analysis, a keyword-based search was performed using the Research Information Service System (RISS) and KoreaMed, the national electronic databases in South Korea. Based on the titles and keywords used in previous studies, the search keywords included: “breast cancer,” “psychosocial intervention,” “depression,” “anxiety,” “psychological treatment,” “psychological education,” and “quality of life” [12-18]. The search period and participants were set to 2001–2020 and adults aged ≥ 18 years, respectively, and both authors independently performed the search. This study referred to the guidelines of the National Evidence-Based Healthcare Collaborating Agency and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses [19].

Procedures

The study selection criteria were as follows: psychosocial interventions, providing result indicators for the variables of psychosocial adaptation through psychosocial intervention, and randomized controlled studies, with a pretest-posttest design for the experimental group. The following interventions were excluded: complementary or alternative simple exercise programs, exercise therapy, occupational therapy, physical therapy, yoga, massage, and art therapy. The main psychosocial intervention methods included psychotherapy, psychological therapy, cognitive therapy, cognitive behavioral therapy, psychological education, cognitive rehabilitation and education programs related to psychology; as well as third-generation treatments such as acceptance and commitment therapy and meditation-based therapy (e.g., mindfulness and meditation) [20]. For meta-analysis using the R program, statistical data regarding effect size estimation are required, where the data should contain the mean and standard deviation (SD) and sample size for pretest-posttest differences among the dependent variables in each group. Thus, any studies not reporting these statistics were excluded from the meta-analysis.

Quality Evaluation

The Jadad scale was used to assess the quality of the randomized controlled clinical studies. This tool is rated

on a six-point scale to assess the following domains: randomized study, double-blinded study, explanations for withdrawal and dropout, and appropriateness of blinding (in case of random allocation) [21]. To ensure fairness and validity, two investigators independently performed the evaluation.

Heterogeneity Test

To test the results extracted from each study, that is, the heterogeneity of the effect size, the Q -value and I^2 were used. The Q -value indicates the observed distribution of each effect size in the meta-analysis, which includes the standard error distribution and the actual deviations among studies. The Q -value may be significantly influenced by the number of studies included in the meta-analysis (k). The I^2 is the ratio of the actual distributions to the total distribution; in general, 25% indicates low heterogeneity, 50% moderate heterogeneity, and 75% high heterogeneity [22,23].

Effect Size Estimation

To calculate the effect size of each study, Hedge's g was used with a 95% CI [24]. For studies not reporting effect sizes, the means and SDs of the pretest and posttest results were used for direct calculation. An effect size ≥ 0.20 was interpreted as small, ≥ 0.50 as medium, and ≥ 0.80 as large. Then, the mean or summary effect size was calculated.

Data Analysis

The effect size of each study was estimated, and the R package "meta" and "metafor" were used for statistical analyses [25].

Publication Bias

To eliminate publication bias, a common problem in meta-analyses, the funnel plot was used [26,27]. The funnel plot visually presents the relationship between sample and effect size in the shape of a funnel. The y-axis is the standard error and the x-axis is the effect size; studies with large sample sizes are generally located at the top of the graph whereas those with small sample sizes are toward the bottom. In a funnel plot, left to right symmetry is observed if the data lack any bias; however, for data with bias, an asymmetrical plot is obtained. Additionally, for the statistical analysis of asymmetrical data, Egger's regression test is most frequently used [28].

RESULTS

Study Selection

The database search using the term "breast cancer" yielded 5,138 articles; among these, 119 contained the term "psychology," 917 "treatment," 24 "intervention," 99 "depression" or "anxiety," and 178 "quality of life." The number of articles that met the selection criteria and were, therefore, selected for subsequent analyses was 28. Fifteen studies did not concern psychosocial dependent variables and 18 involved treatments other than psychosocial interventions. Including eight duplicates, a total of 25 articles were excluded. Next, among the 28 remaining studies, eight satisfied the criteria for meta-analysis; 20 did not report the mean and SD of each group or the standardized mean difference. Therefore, eight articles were finalized for the meta-analysis [29-36]; the quantity of data of these eight studies was $k = 33$ (Fig. 1).

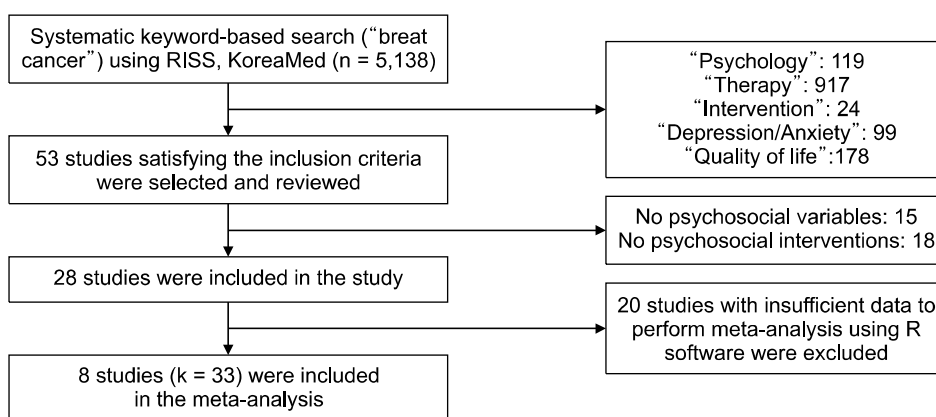


Fig. 1. Flow diagram of the study selection process. RISS, Research Information Service System.

Table 1. Characteristics of included studies

Author	No. of sessions	Time/session (min)	Intervention structure (type)	Practitioner	No. of dependent variables	No. of participants (exp/cont)
Hwang <i>et al.</i> (2002) [29]	8	90	Group (psychoeducation)	Social worker	1 (depression)	22/13
Kim and Kwon (2005) [30]	12	50	Group (relaxation, reconstruction of cognition, stress coping, social support training)	Psychologist	9 (QoL, interpersonal coping, reconstruction, active coping, passive coping, interpersonal sensitivity, depression, anxiety, hostility)	18/11
Yoo <i>et al.</i> (2009) [31]	6	120	Group (Ellis's REBT, psychoeducation)	Nurse	2 (depression, anxiety)	35/36
Park <i>et al.</i> (2013) [33]	6	240	Group (MBSR)	Professional in meditation	8 (QoL-symptom, QoL-function, hostility, interpersonal sensitivity, depression, anxiety, somatization, sleep quality)	15/5
Jang (2013) [32]	8	60	Group (meditation program)	Nurse	3 (QoL, depression, anxiety)	20/21
Bae and Tae (2015) [34]	4	100	Group (forgiveness therapy)	Nurse	4 (forgiveness, self-esteem, depression, spiritual well-being)	15/15
Kang <i>et al.</i> (2015) [35]	8	120	Group (ACT)	Psychologist	3 (stress, depression, anxiety, QoL)	6/9
Park <i>et al.</i> (2018) [36]	3	40	Individual (psychoeducation for distress management)	Nurse	2 (distress, QoL)	25/22

Exp, experimental group; Cont, control group; REBT, rational emotive behavior therapy; MBSR, mindfulness-based stress reduction; ACT, acceptance and commitment therapy; QoL, quality of life.

Quality Evaluation

The quality evaluation based on the Jadad scale showed inter-rater agreement on eight studies. The mean difference of rated scores was evaluated; no significant difference was found ($p = 0.35$). The inter-rater correlation was significant 0.78 ($p < 0.001$).

Study Characteristics

A total of eight studies and 33 datasets were included in the analyses. The publication dates ranged between 2002 and 2018. The total number of participants across the studies was 288 (mean = 30.15, SD = 17.54); the number of participants in experimental groups was 156 (mean = 17.21, SD = 8.47) and in control groups was 132 (mean = 12.94, SD = 9.74). The SD of the number of participants was large, with a high level of heterogeneity across the sample of each study. The mean number of sessions was 7.93 and the mean intervention time was 793.9 minutes (13.2 hours). Regarding intervention structure, 94% (8 out of 9) involved group intervention, with one study applying an individual intervention. Regarding intervention type, 36.4% used an integrated intervention, 30.3% used a cognitive intervention, 24.2% used meditation, and 9.1% provided psychological education. Among practi-

tioners, the most frequent was the nurse (50%), followed by a psychologist (25%). Other practitioners included social workers and meditation professionals. The dependent variables are psychosocial-related variables, and they include Beck Depression Inventory, Hospital Anxiety and Depression, The Ways of Coping Checklist, Enright's Forgiveness Inventory, Functional Assessment of Cancer Therapy-Breast, State Trait Anxiety Inventory, and so on (Table 1).

Mean Effect Size and Heterogeneity Statistics

From the eight studies, the effect size was estimated for 33 datasets. Owing to the differences in participant characteristics and intervention types among the studies, it was difficult to assume a homogenous group. Thus, the random effect model was applied in estimating the effect size. The mean effect size through Hedges's g was 1.21 against no treatment group. The range was 0.95–1.48 at 95% CI, with the result indicating a large effect. In Figure 2, the experimental group means the treatment group, and the control group means the no treatment group (Fig. 2). The I^2 showed 68.9% (55.5–78.2 at 95% CI) with moderate heterogeneity.

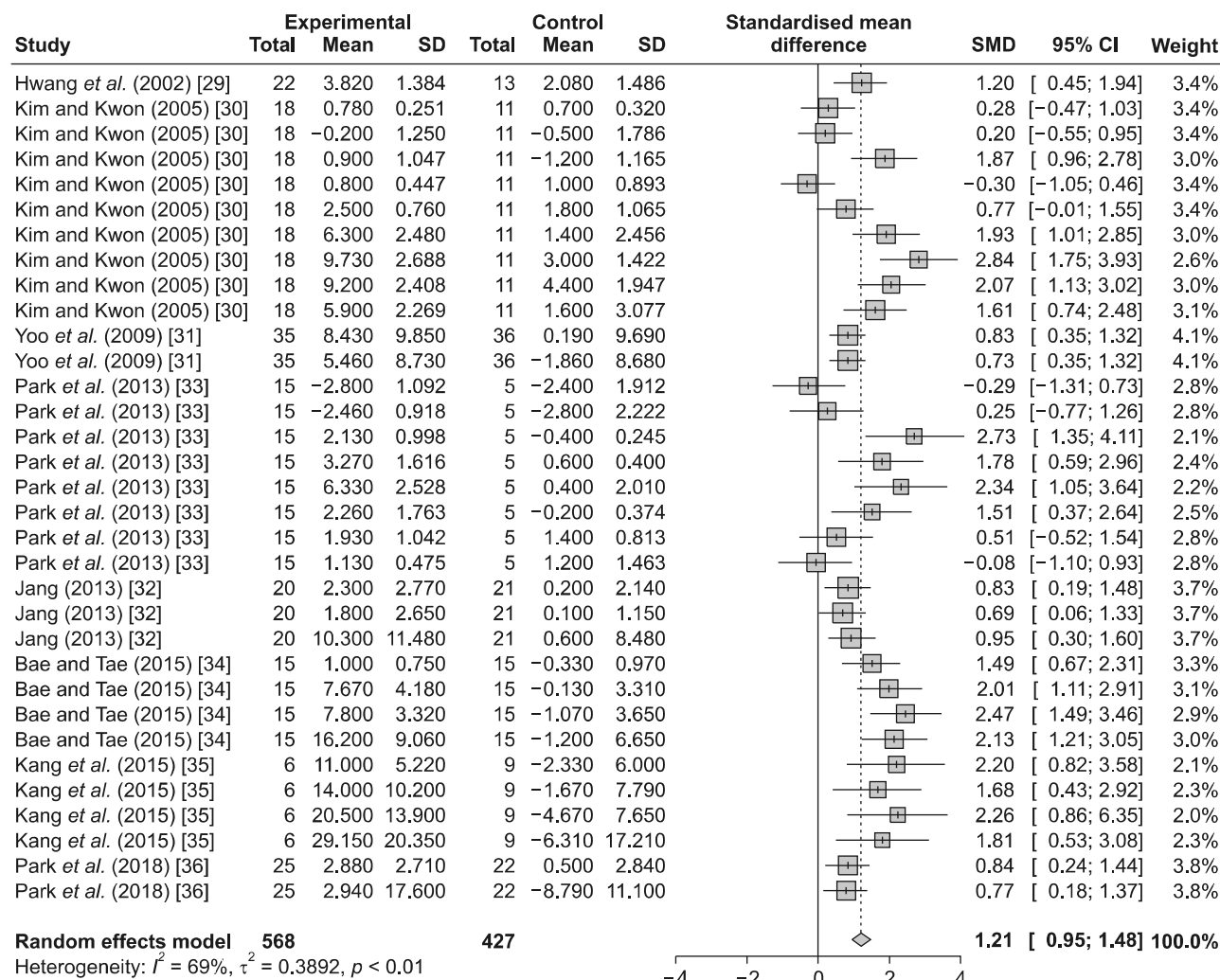


Fig. 2. Forest plot of individual and pooled effect (95% confidence interval [CI]). SMD, standardized mean difference.

Publication Bias

The funnel plot showed a relatively wide distribution of the studies with small sample sizes, which were mostly located on the right, based on risk ratio = 1.0 with a clearly visible asymmetry. The Egger’s regression test result also showed a significant p value ($t = 3.25$, $df = 31$, $p = 0.002$) for bias (Fig. 3).

DISCUSSION

In this research, studies on psychosocial interventions for patients with breast cancer in South Korea were systematically reviewed, and a meta-analysis was performed. First, using the RISS and KoreaMed, over 5,000 articles were found, of which 28 reported on the effects of psy-

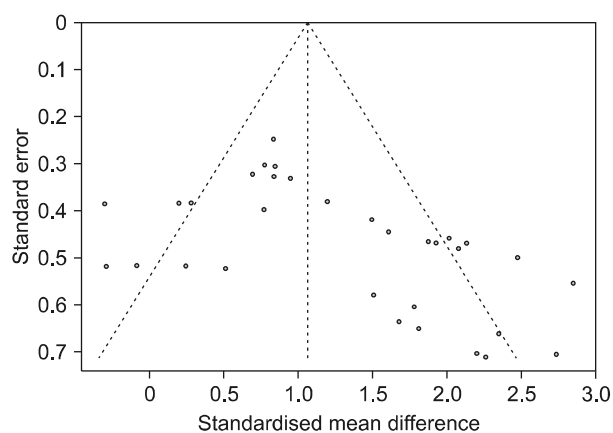


Fig. 3. Funnel plot of standard error by standard mean difference.

chosocial interventions. Nevertheless, among the studies satisfying the inclusion criteria (randomized controlled study/pretest-posttest design/variables related to psychosocial adaptation/comparison of psychosocial intervention effects), only eight reported the mean and SD of each group as well as the standardized mean difference. These eight studies presented 33 datasets, for which a meta-analysis was performed.

First, analyzing the study characteristics showed that the psychosocial interventions were generally provided by nurses, with an integrated intervention performed for 90 minutes per session for eight sessions. Presumably, the reason nurses do it the most is because they have better access to breast cancer patients because the patients have to visit the hospital for the drug medication. Meanwhile, regarding the intervention type, most were cognitive, and in light of this, employing cognitive or cognitive behavioral therapy professionals may be effective. Additionally, through 13.2 hours of mean intervention time, a large effect was obtained; it is believed that psychosocial interventions are an essential part of enhancing the quality of life of patients with breast cancer with respect to time constraints and financial feasibility.

Regarding the effect size, the effects of psychosocial interventions on patients with breast cancer were substantially large—the mean effect size of 1.21 can be interpreted as a large effect. In a South Korean meta-analysis on depression treatment in patients with breast cancer, a mean effect size of $d = 3.92$ was observed, indicating that psychosocial interventions have a positive effect on reducing the levels of depression, anxiety, and negative emotions such as aggression, and on enhancing quality of life. However, the Q -value and I^2 showed was 102.76 ($p < 0.001$) and 68.9%, respectively, which is indicating heterogeneity in effect sizes. In contrast to previous studies from South Korea, where depression was the only dependent variable in the psychosocial dimension, the present study utilized diverse psychosocial variables [5]. In addition to depression, the variables of anxiety and negative emotions, such as aggression, interpersonal sensitivity, and stress, as well as positive emotions such as coping and self-esteem, were included. Meanwhile, for publication bias, data asymmetry with statistical significance was found, which may be attributed to the inclusion of studies with small sample sizes.

This study had the following limitations. First, there are

few South Korean studies examining psychosocial interventions for patients with breast cancer. Certainly, studies have reported on exercise programs, physical therapy, laughter therapy, yoga, and art therapy; however, these remain limited in number and were not included in this study, which was on psychosocial interventions. Additionally, even among the studies on psychosocial interventions for patients with breast cancer, some could not be included due to the lack of data required for meta-analysis. There is a need for more active research on psychosocial interventions for patients with breast cancer with respect to social and policy effects, based solely on two facts: first, breast cancer is the most common cancer among South Korean females, and second, psychosocial interventions have a large effect. Globally, there are several thousand studies regarding psychosocial interventions for patients with breast cancer, for which systematic reviews and meta-analyses have already been performed [37]. Considering the potential issue of persistence regarding therapeutic effects, meta-analyses should be performed for all future studies.

The first treatment for cancer patients is surgery and medication. However, other education and programs, as well as drug treatment for cancer patients, may reduce the distress in cancer patients [38]. This study concludes that cognitive interventions, meditation, and psychological education programs can be effective to assist in reducing negative emotions and enhancing quality of life in patients with breast cancer.

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■ Conflicts of Interest

No potential conflict of interest relevant to this article was reported.

■ Author Contributions

Conceptualization: Sang-Yeol Lee, Kyu-Sic Hwang. Data acquisition: Hye-Jin Lee, Kuy-Haeng Lee. Formal analysis: Kyu-Sic Hwang, Chan-Mo Yang. Funding: Sang-Yeol Lee, Hye-Jin Lee. Supervision: Sang-Yeol Lee. Writing—original draft: Kyu-Sic Hwang, Chan-Mo Yang. Writing—re-

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